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The Delphion Integrated View

Title: **JP5069570A2: THICK FILM TYPE THERMAL HEAD**

Country: JP Japan
Kind: A

Inventor: **HAGA KOICHI;**
NISHINO SACHIKO;

Assignee: **FUJI XEROX CO LTD**
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Application Number: **JP1991000089430**

IPC Code: B41J 2/335;

Priority Number: March 29, 1991 **JP1991000089430**

Abstract:

PURPOSE: To enhance image quality by eliminating the generation of a dent on a recording medium due to the edge in a sub-scanning direction of a heating resistor by extremely making the width of the heating resistor in the sub- scanning direction larger than the interval between electrodes and reducing the internal strain of the heating resistor.

CONSTITUTION: A thermal head has a common electrode 2, a plurality of individual electrodes 3 mutually independently arranged in opposed relation to the common electrode in a main scanning direction, the heating registers 4 bridging the common electrode 2 and the individual electrodes 3 in a sub-scanning direction and the protective layer 6 covering the common electrode 2, the individual electrodes 3 and the heating resistors 4. Dummy resistors 5a, 5b are provided on the common electrode 2 and the individual electrodes 3 so as to be adjacent to the end parts of the heating resistors 4 in the sub-scanning direction.

Family: None

Other Abstract Info: None

JP 05-069570
CLAIMS

[Claim 1] Common electrode. Two or more individual electrodes which counter independently mutually to a common electrode and are arranged at main scanning direction. The exoergic resistor bridged in the direction of vertical scanning on each of the above-mentioned common electrode and an individual electrode. It is a wrap protective layer about the above-mentioned common electrode, an individual electrode, and an exoergic resistor. It is the thick-film type thermal head equipped with the above, and is characterized by having adjoined the direction edge of vertical scanning of the aforementioned exoergic resistor, and establishing a dummy-resistor object on each of the aforementioned common electrode and an individual electrode.

DETAILED DESCRIPTION

[0001] [Industrial Application] this invention relates to the thick-film type thermal head equipped with the new structure for starting the thick-film type thermal head of an individual opposed type, especially raising the quality of printed character of recording devices, such as a sublimation formula printer.

[0002] [Description of the Prior Art] As a recording head used for the record means of recording devices, such as a sensible-heat method printer and facsimile, the recording head called so-called thick-film type thermal head from the ease of manufacture is large, and it is adoption ********. The sublimation formula recording device which is made to carry out heating sublimation of the ink of an ink donor film, and forms a picture and a character in a record medium as one form of a sensible-heat method recording device is known.

[0003] The substrate which drawing 5 is important section explanatory drawing of the sublimation formula recording device which made the thick-film type thermal head the print head, and 1 becomes from insulating materials, such as ceramics, and 2 are the exaggerated glaze layers which are protective layers in which an individual electrode and 4 covered the exoergic resistor, 6 covered the exoergic resistor, the common electrode, and the individual electrode, and a common electrode and 3 were formed, and the thick-film type thermal head 10 is constituted by these composition layers. Moreover, as for a platen and 8, 7 is [a record medium and 80] ink donor films. In this drawing, at the time of record, the pinching press of a record medium 8 and the ink donor film 80 is carried out by the press force shown by Arrow P between the thick-film type thermal head 10 and the platen 7, and transference, now record are performed for the color sublimated by heating the ink donor film 80 by generation of heat of a thermal head to a record medium (sublimated type recording paper) 8. A thermal head is classified from the arrangement structure of the electrode, and is divided roughly into the mutual lead type thermal head by which the individual opposed-type thermal head by which opposite arrangement of a common electrode and the individual electrode was carried out in the direction of vertical

scanning, and a common electrode and an individual electrode were arranged by main scanning direction in the shape of a ctenidium.

[0004] Drawing 6 is an important section plan explaining the structure of the thick-film type thermal head of the individual opposed type by the conventional technology, and 010 is a thick-film type thermal head and an exaggerated glaze layer an exoergic resistor and whose 06 a common electrode and 03 are [01 / for a ceramic substrate and 02] protective layers as for an individual electrode and 04. This kind of thick-film type thermal head is manufactured by the lift-off method for printing the resistive-layer formation material used as electrode stratification material or a heating element as the shape of a paste, applying and calcinating it, and obtaining a desired composition layer.

[0005] Drawing 7 is the cross section of a thick-film type thermal head shown in drawing 6 , and (a) shows the main-scanning-direction cross section to which (b) met the B-B line of drawing 6 in the direction cross section of vertical scanning which met the A-A line of drawing 6 . As shown in this drawing (a) and (b), the exoergic resistor 04 formed the common electrode 02 and the individual electrode 03 upwards, and is bridged and formed in the upper part of these two electrodes. Therefore, since the cross-section configuration of the direction of vertical scanning of the exoergic resistor 04 of the thick-film type thermal head of the individual opposed type manufactured by this kind of lift-off method is a convex in the direction of a record medium, the exaggerated glaze layer 06 is also making the convex configuration. In addition, JP,1-123756,A and JP,64-44762,A can be mentioned as what indicated the above-mentioned conventional thick-film type thermal head. By making the Lord and the cross-section configuration of each direction of vertical scanning into a rectangle for the configuration of an exoergic resistor, the thick-film type thermal head of an indication in each above-mentioned official report makes the exoergic distribution of an exoergic resistor uniform, and raises, the repeatability, i.e., dot repeatability, of a flat-surface configuration of an exoergic resistor.

[0006] [Problem(s) to be Solved by the Invention] In this conventional kind of thick-film type thermal head, if it energizes to the exoergic resistor 04 through the common electrode 02 and the individual electrode 03 in order that there may be no big difference in the interval D of the common electrode 02 and the individual electrode 03, and a size with the direction width of face d of vertical scanning of the exoergic resistor 04, the exoergic resistor 04 will cover the overall length to the edge, and will be heated. Therefore, the exaggerated glaze layer 06 will also be heated for the whole heights to the edge. When it carries in the sublimation formula recording device of this thermal head and printing etc. is recorded on a sublimation formula record medium, the whole convex configuration portion of the exaggerated glaze layer on an exoergic resistor heats the front face of a record medium 8 with generation of heat of an exoergic resistor, the color of ink will transfer to a part for the center section which reaches the temperature to which the color of an ink donor film is made to sublimate, and record will be made.

[0007] Drawing 8 is a ** type view explaining the record state of a sublimated type record medium where the thick-film type thermal head of an individual opposed type was used, and vertical-scanning width of face of an exoergic resistor is conventionally set to

about 170 micrometers for the horizontal-scanning width of face of an exoergic resistor in the 10 dot(s)/mm thermal head to 70 micrometers and inter-electrode width of face of 140 micrometers. In this case, the indentation of an exoergic resistor salient (salient of an exaggerated glaze layer) itself serves as the concave 11 which imprinted the configuration of the edge of this salient, and, as a result, the surroundings of an indentation become a convex. Moreover, since it is ejection 0.1 mm/line in the case of the exoergic resistor size above-mentioned by 10 dot/mm, the lap cost of the 70-micrometer concave 11 arises, and the irregularity on the front face of a record medium becomes intense by the lap cost. As for an indentation being attached to a record medium in the convex configuration of the edge of the above-mentioned exoergic resistor (exaggerated glaze layer), heat is transmitted to the edge of an exaggerated glaze layer to the edge of the direction edge of exoergic resistor vertical scanning therefore, and the above-mentioned edge of a sublimation formula record intermediation body surface is for all the hitting fields being [become] easy to deform.

[0008] That is, since the front face of the record medium 8 for sublimation formula record is what will be in the state of being easy to deform with heat, if it prints by the above-mentioned thermal head, as shown in this drawing (a), a convex configuration with the edge of the exaggerated glaze layer 6 of the same size will be mostly imprinted as it is by the front face of a record medium 8 as a crevice 11 with the edge of the exoergic resistor 4 of a thick-film type thermal head, therefore the edge of this exoergic resistor 4. And the color 9 of the ink attained and sublimated to sublimation temperature transfers to the center section of the above-mentioned crevice 11. A part for the record intermediation soma which the color 9 transferred is swollen like illustration, and becomes convex slightly. And as the next record operation showed to (b), a crevice 11 is further overlapped on the crevice 11 formed by previous record, and as this showed (c), a crevice 11 and the swelling section are formed one after another. For this reason, irregularity occurs violently on the front face of a record medium 8, dot repeatability is spoiled, and there is a problem of as a result causing degradation of quality of image. In addition, it is related with sublimation formula record and is "a television society technical report" (vol.14, no.6, pp.1-6, and "high definition-ized in sublimated type hot printing printing" 1990 can be mentioned.), for example.

[0009] As what solves the above problems, it sets to the thick-film type thermal head of the individual opposed type by the lift-off method, and is the edge () of the direction edge of vertical scanning of the above-mentioned resistor considering the width of face of the direction of exoergic resistor vertical scanning as more than the double precision of the width of face of an electrode spacing. That is, without making it not influenced of the direction edge of vertical scanning of an exaggerated glaze layer, and spoiling the goodness of dot repeatability, the irregularity on the front face of a record medium recorded by the sublimation formula recording device is lost, and raising quality of image is proposed. Although preparing opening of the exoergic resistor configuration which should be formed in the photoresist pattern formed by exposure of a photoresist and development is performed in case the above-mentioned exoergic resistor is created by the individual opposite lift-off method, it falls or becomes easy for the photoresist (henceforth a photoresist pillar) of a portion which separates the exoergic resistor which

should be approached and formed to break, so that the direction width of face of vertical scanning becomes long. If main-scanning-direction width of face of a photoresist resist pillar is enlarged in order to lose this, the main-scanning-direction width of face of an exoergic resistor will become small, and the problem that relation of the main scanning direction of a record dot gets worse will arise.

[0010] One example of the according [(a)] to photoresist pattern for the conventional thermal head manufacture photoresist pattern for thermal head manufacture drawing 9 is explanatory drawing of the photoresist pattern for exoergic resistor formation in an exoergic resistor formation process, and according [(b)] to this invention is shown. the openings FR1 and FR2 for exoergic resistor formation which opening for exoergic resistor formation, C1, C2 and C3, and .... adjoin in this drawing (a) in the photoresist which hardened F by exposure, FR1 and FR2, FR3, and ...., FR3, and .... it is the photoresist pillar which separates between These photoresist pillars C1, C2, and C3 and .... In the process which fills up the openings FR1 and FR2 concerned, FR3, and .... with a resistor paste in order that the direction of vertical scanning may be long, namely, may form the resistor of the thermal head which carried out width of face of the direction of resistor vertical scanning in the above-mentioned conventional technology to more than the double precision of the width of face of an electrode spacing the adjoining openings FR1 and FR2, FR3, and .... a fall lump should arise, or a crease should arise, he distorts the configuration of an exoergic resistor or separation between adjoining resistors should do to a side -- there is nothing Therefore, the manufacture yield falls and the yield falls about 40% compared with the thermal head equipped with the resistor of the conventional usual size shown in drawing 6 .

[0011] Moreover, when the direction of vertical scanning is long compared with the size of the main scanning direction of a resistor paste, contraction of the direction of vertical scanning becomes large at the time of baking of this resistor paste, a big internal distortion occurs in the exoergic resistor after baking, and it is a step. Stress There is a problem that test intensity (it is called below Stepp Stress Test:SST intensity) falls. In the huge resistor (the direction of main-scanning-direction x vertical scanning : 70micrometerx 350 micrometers) which made the direction width of face of vertical scanning of a resistor incidentally shown in (a) of drawing 4 explained below the double precision of electrode spacing width of face, 25% or more of fall is seen rather than the resistor (this 70 micrometerx 170 micrometers) of the usual size which showed SST intensity in this drawing (b).

[0012] Drawing 4 is explanatory drawing showing a SST on-the-strength measurement result [in / one example of this invention / (a) / size and (b), and / in (c)] conventionally. / the above-mentioned huge size Drops voltage (drop voltage) is set [test time (SSTtime)] to 0.5V for 20sec(s) and impression pulse width (pulse width) by being set 6msec(s) and a pulse period to 20msec(s). Impression power (W watt) is taken along a horizontal axis, resistance deflection (resistance variance percent) is taken along a vertical axis, and it is shown. The purpose of this invention reduces the internal distortion of an exoergic resistor, and aims at offering the thermal head which raised picture quality while it is accurate and it enables manufacture of the thermal head which is going to

cancel indentation generating on the record medium according the exoergic resistor vertical-scanning width of face which constitutes an individual opposed-type lift-off thermal head to this direction edge of resistor vertical scanning as for example, more than the double precision of an electrode spacing.

[0013] [Means for Solving the Problem] In order to attain the above-mentioned purpose, it is characterized by this invention using as a dummy-resistor object the exoergic resistor by the side of the direction edge of vertical scanning which prepared the slit of main scanning direction in each upper part by the side of the common electrode of the above-mentioned exoergic resistor of the thermal head which the vertical-scanning width of face of an exoergic resistor carried out to more than the double precision of an electrode spacing, and an individual electrode, and was separated in the direction of vertical scanning by this slit. Namely, two or more individual electrodes which this invention counters independently mutually to a common electrode and a common electrode, and are arranged at main scanning direction, In the thick-film type thermal head which has a wrap protective layer for the exoergic resistor bridged in the direction of vertical scanning to each of the above-mentioned common electrode and an individual electrode, and the above-mentioned common electrode, an individual electrode and an exoergic resistor It is characterized by having adjoined the direction edge of vertical scanning of the aforementioned exoergic resistor, and establishing a dummy-resistor object on each of the aforementioned common electrode and an individual electrode.

[0014] [Function] By having adjoined the direction edge of vertical scanning of the aforementioned exoergic resistor, and having established the dummy-resistor object on each of a common electrode and an individual electrode Like the thermal head for sublimated type recording devices which carried out the direction width of face of vertical scanning of an exoergic resistor to more than the double precision of an electrode spacing The photoresist pillar at the time of creating the thermal head made into size with the fairly larger direction width of face of vertical scanning of a resistor than main-scanning-direction width of face and the thermal head which has an equivalent effect by the Fort Lee SOGURAFU technique falls, and ****** is lost. And while reducing the internal distortion of an exoergic resistor, forming an accurate exoergic resistor and raising record quality, the large thermal head of the yield can be obtained. Moreover, it becomes possible to make conventionally SST intensity of the exoergic resistor which functions as a heating element into what whose size relation between the direction width of face of vertical scanning of this resistor and electrode spacing width of face is under double precision and is equivalent to the thermal head of form.

[0015] [Example] Hereafter, with reference to a drawing, it explains in detail about the example of this invention. Drawing 1 is an important section plan explaining one example of the thick-film type thermal head by this invention, and, for a common electrode and 3, as for an exoergic resistor, and 5a and 5b, an individual electrode and 4 are [1 / a ceramic substrate and 2 / a dummy-resistor object and 6] exaggerated glaze layers. Moreover, drawing 2 is the cross section of a thick-film type thermal head shown in drawing 1 , and the direction cross section of vertical scanning with which (a) met the A-A line of drawing 1 , and (b) are the cross sections which met the B-B line of drawing

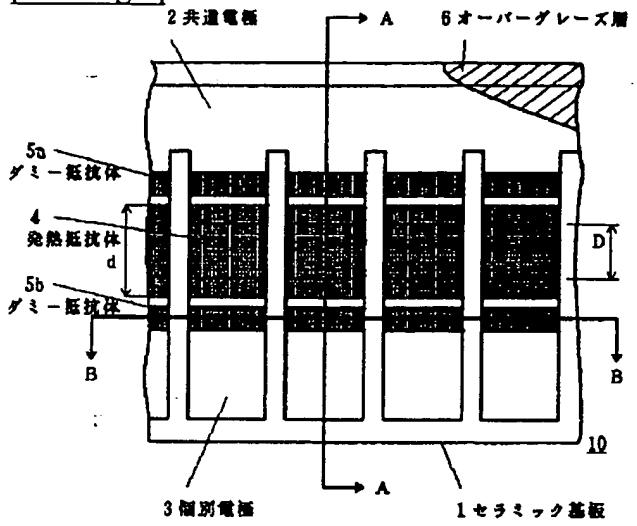
1 . In drawing 1 and drawing 2 this thermal head The common electrode 2 and two or more individual electrodes 3 are formed in the upper surface of the ceramic substrate 1. It has the exoergic resistor 4 bridged and arranged on the common electrode 2 and the individual electrode 3 which counter at intervals of D (electrode spacing width of face), respectively. Furthermore, it has the dummy-resistor objects 5a and 5b arranged on each of the common electrode 2 and the individual electrode 3 through the direction edge of vertical scanning and slit of the above-mentioned exoergic resistor 4. And width-of-face d' of the direction of vertical scanning including the dummy-resistor objects 5a and 5b is more than the double precision of an electrode spacing D. It has the slit which met the position where only predetermined distance separated from the electrode opposite edge of the exoergic resistor 4 in the direction of vertical scanning, respectively at main scanning direction, and the exoergic resistor portion separated to this slit is used as the dummy-resistor objects 5a and 5b, respectively. It dissociates from the exoergic resistor 4 thermally, and the exoergic resistor 4 of the direction width of face d of vertical scanning forms the exoergic section, and contributes these dummy-resistor objects 5a and 5b to sublimation of an ink donor film.

[0016] Drawing 3 is (a) surface view of a record medium and the (b) cross section which were recorded by the thermal head of this example shown in drawing 1 and drawing 2 . In the thermal head whose above-mentioned inter-electrode width of face D is 140 micrometers as a concrete example of a size the width of face d of the direction of vertical scanning of the exoergic resistor 4 170 micrometers, The dummy-resistor objects 5a and 5b whose direction width of face of vertical scanning is 25 micrometers were established in the direction of vertical scanning of the exoergic resistor 4 through the slit with a width of face of 30 micrometers, and it is what made sum total width-of-face d' of the direction of vertical scanning of the exoergic resistor 4 and the dummy-resistor objects 5a and 5b the double precision (280 micrometers) of the inter-electrode width of face D, and recorded. As shown in this drawing, an indentation (concave) with the edge (edge of the exaggerated glaze layer 6) of the exoergic resistor 4 of the direction of vertical scanning is not seen, but it will be in the state where the sublimation color transfer section 9 swelled a little. Therefore, the surface state of a record medium becomes very smooth as compared with what is depended on the thermal head of the conventional technology, and can offer good quality of image. Moreover, the improvement effect in quality of image can be further raised by carrying out flattening of the exaggerated glaze layer 6 on the upper surface of the exoergic resistor 4 and a dummy-resistor object. After flattening of this exaggerated glaze layer 6 carries out multilayer printing and forms selection of the viscosity of the material which forms an exaggerated glaze layer, wettability, etc., and exaggerated glaze layer material more than the thickness of an exoergic resistor and a dummy-resistor object, it can take the method of grinding and carrying out flattening by wrapping processing. In addition, the above-mentioned numeric value is an example to the last, and this invention is preparing the resistor which contributes to this generation of heat, and the dummy-resistor object separated in a fixed distance in the direction edge of vertical scanning of the resistor which contributes to generation of heat, it loses generating of the indentation of the record medium in the conventional technology, and can improve picture quality.

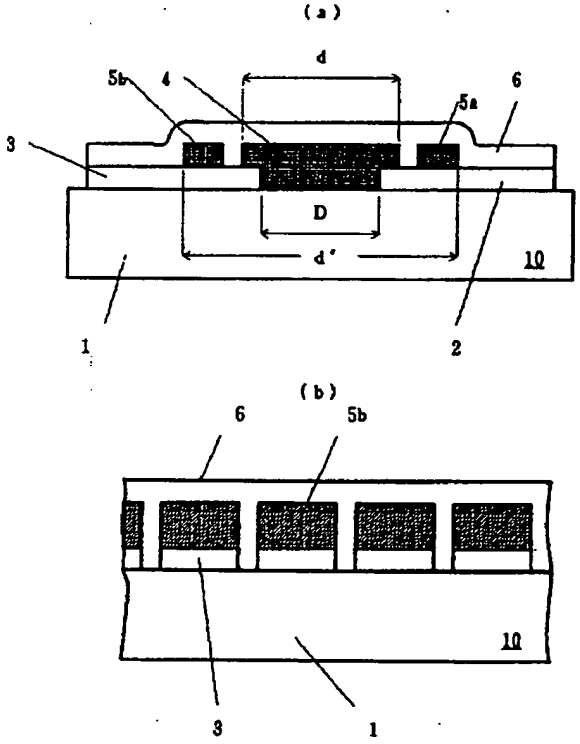
[0017] As drawing 4 is explanatory drawing showing a SST on-the-strength measurement result and was explained above, (a) is explanatory drawing showing a SST on-the-strength measurement result [in / one example of this invention / size and (b), and / in (c)] conventionally. / the above-mentioned huge size Drops voltage (drop voltage) is set [test time (SSTtime)] to 0.5V for 20sec(s) and impression pulse width (pulse width) by being set 6msec(s) and a pulse period to 20msec(s). Impression power (W watt) is taken along a horizontal axis, resistance deflection (resistance variance percent) is taken along a vertical axis, and it is shown. About (a) and (b), it is explanation ending above. (c) is as a result of [of the exoergic resistor in the thermal head of one example of this invention] SST, and it turns out that ****** SST intensity equivalent [like] to the thermal head by the conventional technology of (a) is obtained from this result. That is, since contraction of the resistor by heating of baking at the time of baking of an exoergic resistor paste distributes to three places by establishing a dummy-resistor object, the absolute value of internal distortion becomes small and SST intensity becomes good. In addition, although the above-mentioned example applies this invention to the thick-film type thermal head of an individual opposed type, it is also possible for this invention not to be limited to this and to apply to a mutual lead type thick-film type thermal head. Moreover, this invention is also applicable to the recording device using the thick-film type thermal head used for the ink welding imprint type sensible-heat formula recording device which uses an ink ribbon and a regular paper, or a thermal recording medium.

[0018] [Effect of the Invention] the surface state of the record medium when according to this invention, the exoergic resistor edge section of the direction of vertical scanning, i.e., the edge section of an exaggerated glaze layer, not bringing about deformation of a record medium, and using as a thick-film type thermal head of a sublimation method by preparing a dummy-resistor object in the edge of the exoergic resistor vertical-scanning width of face in the direction of vertical scanning, as explained above -- abbreviation -- it can be kept smooth and good quality of image can be recorded Moreover, since an exoergic resistor can be formed without thickening main-scanning-direction width of face of the photoresist pillar in the manufacture process of an exoergic resistor, without narrowing main-scanning-direction width of face of this exoergic resistor, it can improve and SST intensity can also maintain the manufacture yield good further.

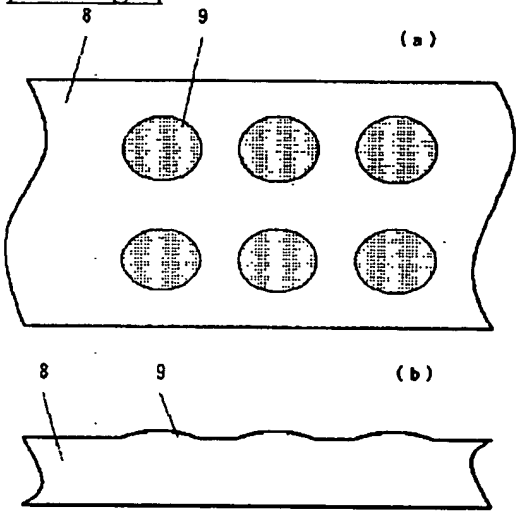
[Drawing 1]



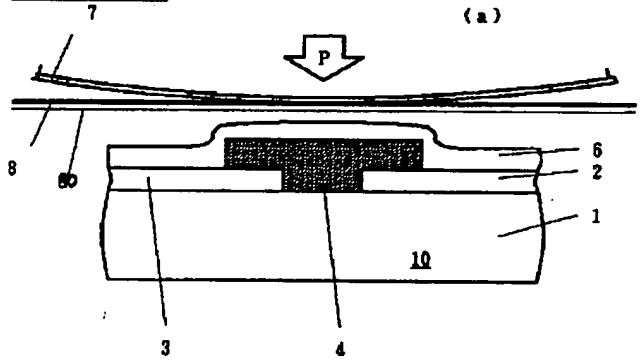
[Drawing 2]



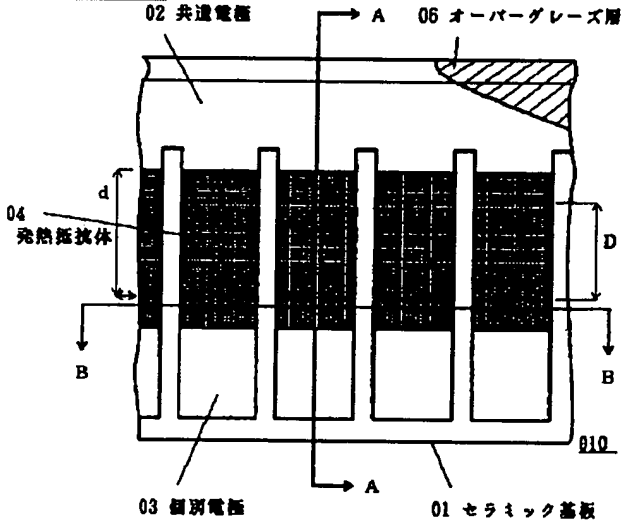
[Drawing 3]



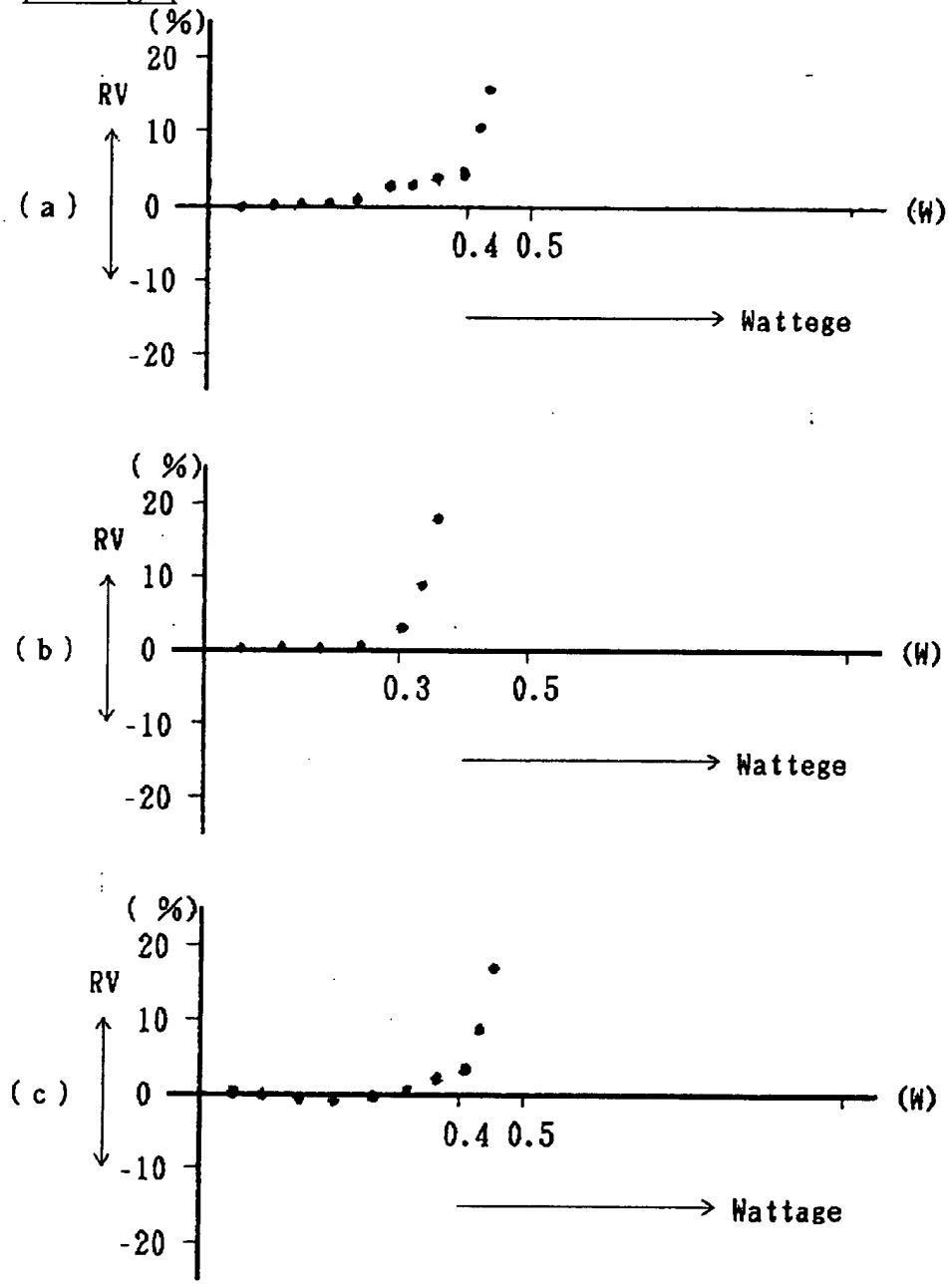
[Drawing 5]



[Drawing 6]



[Drawing 4]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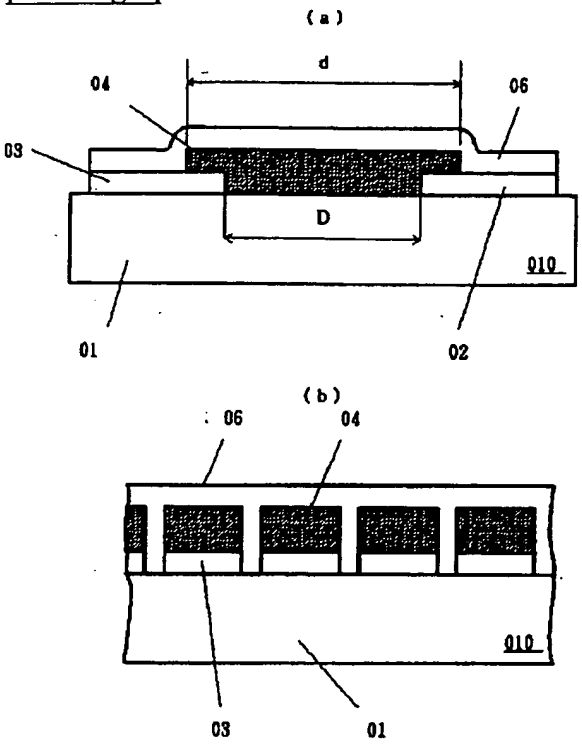
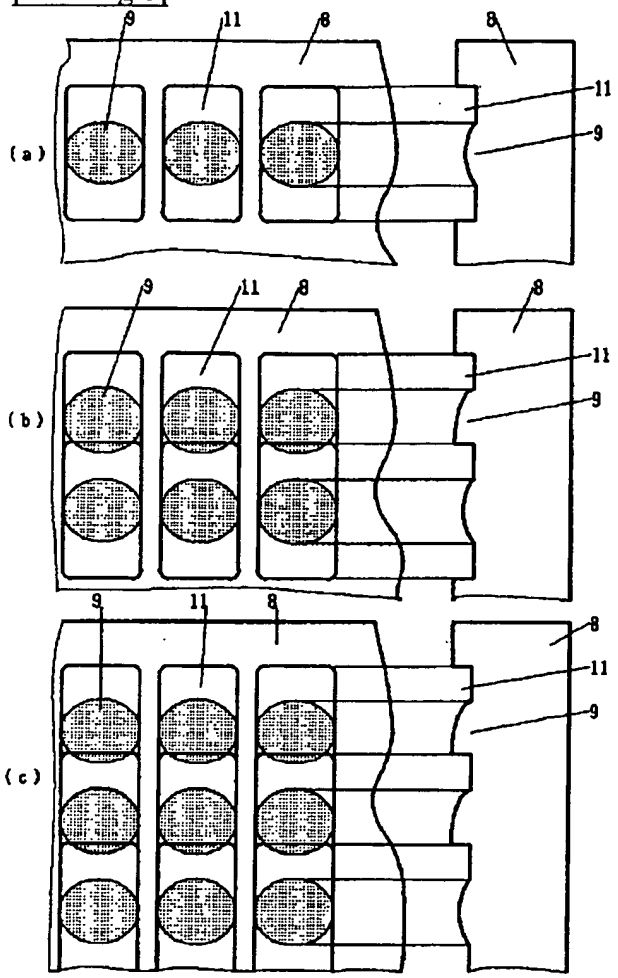
(W)
Wattage

[Drawing 7]

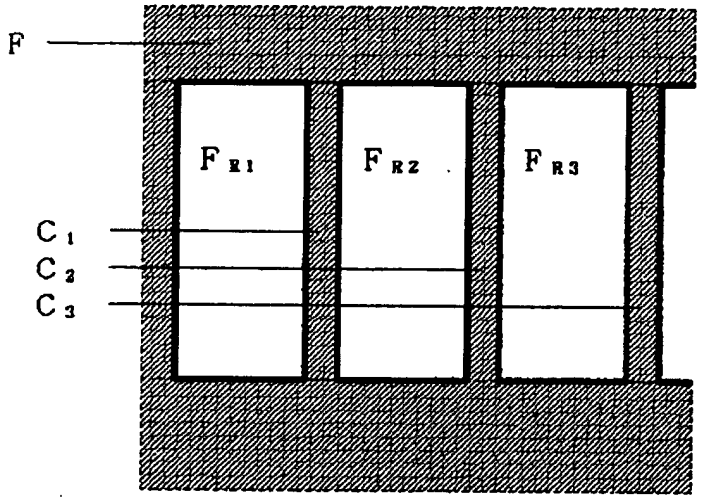


[Drawing 8]



[Drawing 9]

(a)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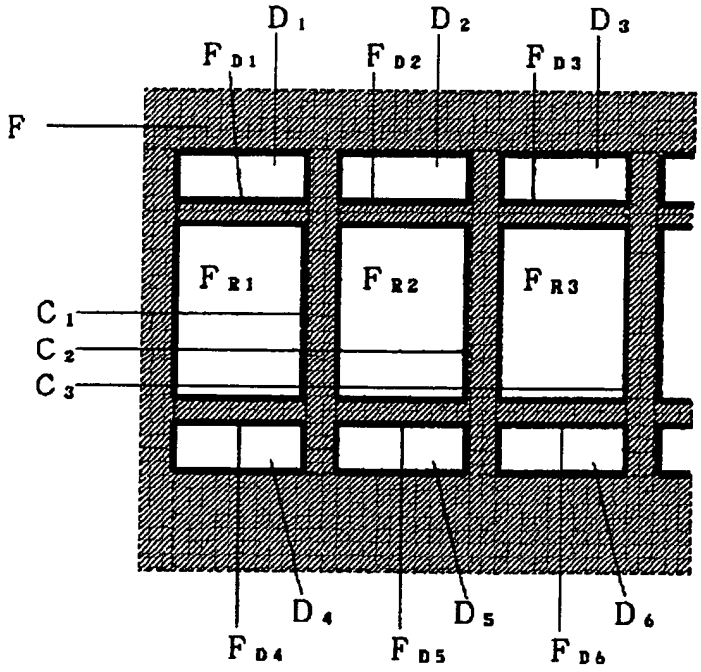
(b)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D 6
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